

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
United States Patent and Trademark
Office
Box PCT
Washington, D.C.20231
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 16 August 2000 (16.08.00)	
International application No. PCT/GB99/03857	Applicant's or agent's file reference 15321 MdH
International filing date (day/month/year) 22 November 1999 (22.11.99)	Priority date (day/month/year) 12 December 1998 (12.12.98)
Applicant PERKINS, John, Patrick	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
10 July 2000 (10.07.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

<p>The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland</p> <p>Facsimile No.: (41-22) 740.14.35</p>	<p>Authorized officer</p> <p>Olivia RANAIVOJAONA</p> <p>Telephone No.: (41-22) 338.83.38</p>
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PATENT COOPERATION TREATY

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INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 15321 MdH	FOR FURTHER ACTION		see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
International application No. PCT/GB 99/ 03857	International filing date (day/month/year) 22/11/1999	(Earliest) Priority Date (day/month/year) 12/12/1998	
Applicant AEA TECHNOLOGY PLC et al.			

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.
☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).
- b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing:
- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of invention is lacking (see Box II).

4. With regard to the title,

- ☒ the text is approved as submitted by the applicant.
- ☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

- ☐ the text is approved as submitted by the applicant.
- ☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.

- ☒ as suggested by the applicant.
- ☐ because the applicant failed to suggest a figure.
- ☐ because this figure better characterizes the invention.
- ☐ None of the figures.

Box III TEXT OF THE ABSTRACT (Continuation of item 5 of the first sheet)

The abstract is modified as follows :

Line 4 : after "transducer" insert "(14)" ;
Line 8 : after "transducer" insert "(14)" ;
Line 12 : after "liquid" insert "(36)".

INTERNATIONAL SEARCH REPORT

International Application No

P 99/03857

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B01J19/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B01J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 658 534 A (DESBOROUGH COLIN L, PIKE ROGER B, WARD LAWRENCE D) 19 August 1997 (1997-08-19) the whole document	1,4
X	GB 2 306 202 A (BRITISH NUCLEAR FUELS PLC) 30 April 1997 (1997-04-30) the whole document	1
A		4
A	US 4 556 467 A (KUHN MARTIN C, ZEITZ VERNON) 3 December 1985 (1985-12-03) claims 14,15	5

☐ Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"Z" document member of the same patent family

Date of the actual completion of the international search

11 February 2000

Date of mailing of the international search report

21/02/2000

Name and mailing address of the ISA

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Authorized officer

Vlassis, M

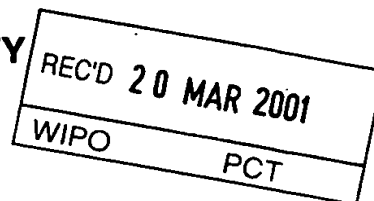
INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

GB 99/03857

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5658534	A	19-08-1997	DE 69102918 D	25-08-1994
			DE 69102918 T	02-02-1995
			EP 0449008 A	02-10-1991
			ES 2056510 T	01-10-1994
			GB 2243092 A, B	23-10-1991
GB 2306202	A	30-04-1997	NONE	
US 4556467	A	03-12-1985	NONE	



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference 15321 MdH	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB99/03857	International filing date (day/month/year) 22/11/1999	Priority date (day/month/year) 12/12/1998
International Patent Classification (IPC) or national classification and IPC B01J19/10		
Applicant AEA TECHNOLOGY PLC et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
 - ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 10/07/2000	Date of completion of this report 16.03.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Grigoraki, E Telephone No. +49 89 2399 8353 

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB99/03857

I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).):*

Description, pages:

1,3-7	as originally filed		
2,2a	as received on	16/10/2000	with letter of 11/10/2000

Claims, No.:

1-7	as received on	16/10/2000	with letter of 11/10/2000
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Drawings, sheets:

1/1	as originally filed
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2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB99/03857

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

5. ☒ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

see separate sheet

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-7
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-7
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-7
	No:	Claims	

- 2. Citations and explanations**
see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB99/03857

Conc. Section I.5:

The feature introduced in claim 1 "at a frequency above 10 kHz" is not disclosed as such in the original disclosure. In fact the highest value which could be found in the description was 200 kHz. The expression above 10 kHz involves frequencies eg above 200 kHz which were not originally disclosed.

The applicant has filed a plurality of extracts from five reference works (dictionaries) showing the definition of "ultrasound". The Examiner has noted that there is not an identical definition in all these references (cf frequencies greater than 16 or 20 kHz and upper limits, if any, of 5 or 1000 MHz are disclosed in these references) whereas in the application 10kHz and 100/140/200 kHz are disclosed as "typically" the lower and the upper limits respectively.

Amended claim 1 is not therefore in consistency with article 34(2)(b) PCT.

>> The remarks below concerning novelty and inventive step are made as if this amendment has not been done in claim 1.

Conc. Section V:

The arrangement of claim 1 of a multiplicity of transducers in an array that extends both circumferentially and longitudinally and are attached to a wall of the vessel (in such a number that the power dissipation within the vessel is at least 25 W/litre but no more than 150 W/litre) and whereby each transducer has a radiation intensity of no more than 3 W/cm² is not disclosed in the prior art cited in search report.

Novelty of the subject matter of **claim 1** in accordance with the requirements of article 33(2) PCT can therefore be acknowledged.

Among them US-5 658 534 (=D1) can be regarded as the closest prior art disclosing an arrangement of transducers having an intensity of 12.76 W/cm². The calculated power dissipation is 208 W/litre. D1 does not disclose the arrangement of transducers in a two dimensional array and at a low intensity of no more than 3 W/cm².

With the claimed arrangement in a two dimensional array of the thus selected low intensity transducers it appears that cavitation blocking can be avoided and ultrasound can propagate a much greater distance (in excess of 0.1 m) at acceptable high ultrasonic power dissipation. A larger volume of fluid can thus be irradiated with greater

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB99/03857

uniformity.

This teaching not being obvious from D1 or the other cited prior art an **inventive step** for the subject matter of **claim 1** in accordance with the requirements of article 33(3) PCT can be also acknowledged.

Claims 2-7 contain preferred embodiments of the apparatus of claim 1 and therefore said claims fulfil also the requirements of articles 33(2) and (3) PCT.